

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

005, G<sup>2</sup>

1. A method of detecting a lysosomal storage disorder (LSD), monitoring the progress of an LSD or the efficacy of treatment of an LSD in a human or animal subject, said method comprising assaying the level of an LSD marker in a biological sample derived from said patient, wherein said LSD marker is an enzyme, a polypeptide or a protein which is associated with the occurrence, development or onset of said LSD, or an immunologically interactive homologue, analogue or derivative thereof.
2. The method according to claim 1 wherein the step of assaying the level of an LSD marker comprises measuring the enzyme activity of said LSD marker in the biological sample.
3. The method according to claim 1 wherein the step of assaying the level of an LSD marker comprises contacting the biological sample with one or more immunointeractive molecules specific for said LSD marker for a time and under conditions sufficient for the formulation of a complex to occur.
4. The method according to claim 3 wherein the immunointeractive molecule is an antibody molecule which binds to the LSD marker.
5. The method according to claim 4 wherein the antibody molecule is a monoclonal antibody which binds to the LSD marker.
6. The method according to any one of claims 3 to 5 wherein the immunointeractive molecule or antibody molecule is labeled with a reporter molecule.

- 48 -

7. The method according to any one of claims 3 to 5 further comprising the step of contacting the complex formed between the LSD marker and the immunointeractive molecule or antibody molecule with a labeled immunointeractive molecule for a time and under conditions sufficient for binding to occur.

8. The method according to claim 7 wherein the labeled immunointeractive molecule is labeled with a reporter molecule.

9. The method according to claim 6 or 8 wherein the reporter molecule is an enzyme, fluorophore or radionuclide molecule.

10. The method according to claim 9 wherein the enzyme, fluorophore or radionuclide molecule is selected from the list comprising horseradish peroxidase, glucose oxidase,  $\beta$ -glactosidase, alkaline phosphatase, fluorescein,  $\text{Eu}^{3+}$  or other lanthanide metal, or rhodamine.

11. The method according to claim 10 wherein the fluorophore molecule is  $\text{Eu}^{3+}$ .

12. The method according to <sup>claim 1</sup> ~~any one of claims 1 to 11~~ wherein the enzyme, polypeptide or protein is a lysosomal enzyme, polypeptide or protein or an enzyme, polypeptide or protein which at least is transported to the lysosome or accumulates in the lysosome.

13. The method according to <sup>claim 1</sup> ~~any one of claims 1 to 11~~ wherein the enzyme, polypeptide or protein is selected from the list comprising Lamp-1, Lamp-2, Limp-II, mannose-6-phosphate receptor,  $\alpha$ -L-iduronidase, 4-sulphatase, acid phosphatase (ACP),  $\beta$ -hexosaminidase, and  $\alpha$ -mannosidase.

14. The method according to claim 13 wherein the enzyme, polypeptide or protein is Lamp-1.

15. The method according to claim 13 wherein the enzyme, polypeptide or protein is Lamp-2.

16. The method according to <sup>claim 1</sup> ~~any one of claims 1 to 15~~ wherein the LSD is selected from the list set forth in Table 1.

17. The method according to claim 16 wherein the LSD is selected from the list comprising MPS I, MPS II, Gaucher disease, Pompe disease and Salla's disease.

18. The method according to claim 17 wherein the LSD marker is Lamp-1.

19. The method according to <sup>claim 1</sup> ~~any one of claims 1 to 18~~ wherein the biological sample is blood, plasma, fibroblast cell or fibroblast cell culture or cell extract thereof.

20. The method according to claim 19 wherein the fibroblast cell or fibroblast cell culture is a skin fibroblast or skin fibroblast cell culture or a cell extract thereof.

21. The method according to claim 20 wherein the fibroblast cell or fibroblast cell culture is a Pompe, Salla, MPS II or MPS VI fibroblast cell or cell culture or a cell extract thereof.

22. An antibody molecule which binds to an LSD marker or a hybridoma or other cell line producing same when used in the method according to <sup>claim 1</sup> ~~any one of claims 1 to 21~~.

23. The antibody molecule according to claim 22 wherein the LSD marker is Lamp-1 or Lamp-2.

- 50 -

24. The antibody molecule according to claim 22 further defined as a polyclonal antibody.

25. The antibody molecule according to claim 22 further defined as a monoclonal antibody.

26. The antibody molecule according to any one of claims 23 to 25 labeled with a reporter molecule.

27. The antibody molecule according to claim 26 wherein the reporter molecule is an enzyme, fluorophore or radionuclide molecule.

28. The antibody molecule according to claim 27 wherein the enzyme, fluorophore or radionuclide molecule is selected from the list comprising horseradish peroxidase, glucose oxidase,  $\beta$ -galactosidase, alkaline phosphatase, fluorescein,  $\text{Eu}^{3+}$  or other lanthanide metal, or rhodamine.

29. The antibody molecule according to claim 28 wherein the fluorophore molecule is  $\text{Eu}^{3+}$ .

30. A kit when used to detect a lysosomal storage disorder (LSD), or monitor the progress of an LSD, or monitor the efficacy of treatment of an LSD, said kit comprising an antigen which comprises an LSD marker enzyme, protein or polypeptide, or an immunologically interactive derivative, homologue or analogue thereof, and a first antibody molecule which is capable of binding to said antigen.

31. The kit according to claim 30 wherein the first antibody is a monoclonal antibody.

- 51 -

32. The kit according to claim 30 wherein the first antibody is a polyclonal antibody.

33. The kit according to any one of claims 30 to 32 wherein the first antibody is labeled with a reporter molecule.

34. The kit according to claim 33 wherein the reporter molecule is an enzyme, fluorophore or radionuclide molecule.

35. The kit according to claim 34 wherein the enzyme, fluorophore or radionuclide molecule is selected from the list comprising horseradish peroxidase, glucose oxidase,  $\beta$ -galactosidase, alkaline phosphatase, fluorescein,  $\text{Eu}^{3+}$  or other lanthanide metal, or rhodamine.

36. The kit according to claim 35 wherein the fluorophore molecule is  $\text{Eu}^{3+}$ .

37. The kit according to <sup>claim 30</sup> ~~any one of claims 30 to 36~~ further comprising a second antibody molecule which recognises the first antibody, wherein said second antibody is conjugated to a reporter molecule.

38. The kit according to claim 37 wherein the reporter molecule is an enzyme, fluorophore or radionuclide molecule.

39. The kit according to claim 38 wherein the enzyme, fluorophore or radionuclide molecule is selected from the list comprising horseradish peroxidase, glucose oxidase,  $\beta$ -galactosidase, alkaline phosphatase, fluorescein,  $\text{Eu}^{3+}$  or other lanthanide metal or rhodamine.

40. The kit according to claim 39 wherein the fluorophore molecule is  $\text{Eu}^{3+}$ .

- 52 -

41. The kit according to claim 38 wherein, if the reporter molecule is an enzyme, said kit further comprises a substrate molecule specific for said enzyme.

42. The kit according to <sup>claim 30</sup> ~~any one of claims 30 to 41~~ wherein the antigen is a lysosomal enzyme, polypeptide or protein or an immunologically interactive homologue, analogue or derivative thereof.

43. The kit according to claim 42 wherein the enzyme, polypeptide or protein is selected from the list comprising Lamp-1, Lamp-2, Limp-II, mannose-6-phosphate receptor,  $\alpha$ -L-iduronidase, 4-sulphatase, acid phosphatase (ACP),  $\beta$ -hexosaminidase, and  $\alpha$ -mannosidase.

44. The kit according to claim 43 wherein the antigen is Lamp-1 or an immunologically interactive derivative, homologue, or analogue thereof.

45. The kit according to claim 43 wherein the antigen is Lamp-2 or an immunologically interactive derivative, homologue, or analogue thereof.

46. The kit according to <sup>claim 30</sup> ~~any one of claims 30 to 45~~ wherein the LSD is selected from the list set forth in Table 1.

47. The kit according to claim 46 wherein the LSD is selected from the list comprising MPS I, MPS II, Gaucher disease, Pompe disease and Salla's disease.

48. An isolated LSD marker enzyme, protein or polypeptide or an immunologically interactive homologue, analogue or derivative thereof when used in the method according to <sup>claim 2</sup> ~~any one of claims 1 to 21~~.

49. The isolated LSD marker according to claim 48 selected from the list comprising Lamp-1, Lamp-2, Limp-II, mannose-6-phosphate receptor,

- 53 -

$\alpha$ -L-iduronidase, 4-sulphatase, acid phosphatase (ACP),  $\beta$ -hexosaminidase and  $\alpha$ -mannosidase.

50. The isolated LSD marker according to claim 49 further defined as Lamp-1.

51. The isolated LSD marker according to claim 49 further defined as Lamp-2.

Ans. P2